

REMARKS

Claims 1, 3, 5-10 are pending. Claims 2, 4, 11-19 are canceled.

Claim Objections

Claims 1, 8 and 10 are objected to for containing informalities.

The Office indication of informality is noted. Relevant claims have been amended, as needed, to overcome this objection. Reconsideration and withdrawal of this objection are respectfully requested.

Double Patenting

The Office has indicated a possible double patenting issue between the family of claims 1, 3, 5-9 and the family of claims 10, 13, 15-19.

Claim 10 is amended to become a dependent claim of independent claim 1 and claims 13 and 15-19 are canceled. By so amending, there is no longer any potential double patenting issue between claims 1 and 10. Reconsideration and withdrawal of the objection are respectfully requested.

Claim Rejections - 35 U.S.C. §103

Claims 1, 5-7, 9-10, 15-17 and 19 are rejected under 35 USC §103(a) as being unpatentable over Hata (U.S. Patent No. 6,215,803) in view of Hatano et al. (U.S. Patent No. 5,998,810).

Claims 15-17 and 19 are concurrently canceled herewith, thus rendering any rejection as applied thereto moot.

In the outstanding Office action, the Office has specifically stated that the “difference between the Hata and the claimed invention is the impurities containing at least one of zinc, beryllium, calcium, and carbon.” By this statement, it is the understanding of the Applicant that the Office is acknowledging that Hata fails to disclose or teach that the impurities contain at least one of zinc, beryllium, calcium, and carbon. The Applicant would agree with this Office assessed shortcoming of Hata.

However, these by no means are the only shortcomings of Hata. It should be noted that Hata also fails to disclose or teach a second current blocking layer. In the present invention, the first current blocking layer is shown by way of an example in Figure 3 with a reference numeral 12. The first current blocking layer 12 has a composition of $\text{Al}_{0.12}\text{Ga}_{0.88}\text{N}$ as explained on page 13, line 20 of the written specification. The second current blocking layer is shown by way of an example in Figure 3 with a reference numeral 121. The second current blocking layer 121 has a composition of $\text{Al}_{0.12}\text{Ga}_{0.88}\text{N}$ as explained on page 13, line 15 of the written specification. Therefore, the present invention clearly discloses a first and a second current blocking layer.

In asserting Hata, the Office points to Figures 3A-3G and asserted that reference numeral 77 is the first current blocking layer. The alleged first current blocking layer 77 has a composition of $\text{Al}_{0.15}\text{Ga}_{0.85}\text{N}$ as explained in column 8, line 35 of Hata. The Office also asserted that reference numeral 66 is the second current blocking layer. It has a composition of $\text{Al}_{0.15}\text{Ga}_{0.95}\text{N}$ as explained in column 8, line 17 of Hata. It should be noted that Hata has never disclosed or taught a second

current blocking layer. Hata discloses reference 66 to be a surface protection layer. Therefore, in addition to the Office assessment that Hata fails to disclose or teach impurities containing at least one of zinc, beryllium, calcium, and carbon, Hata also fails to disclose or teach a second current blocking layer.

In addition, AlGaN layers 66 and 77 as disclosed in Figure 3 of Hata are both p-type layers, not high-resistive layers. Column 8, lines 48-50 of Hata discloses an annealing for transforming the Mg-doped layers to a P-type by stating that “the Mg-doped layers are transformed to P-type.”

Column 10, line 24 of Hatano discloses that the addition of Mg and C increases the p-type carrier concentration. Hatano does not suggest that a high resistance can be obtained by C doping. Moreover, the P-type AlGaN layer 44 of Hatano et al. is a cladding layer, not a current blocking layer.

Given that the Office fails to recognize these shortcomings of Hata and Hatano, even if Hata and Hatano are combined, exactly as suggested in the outstanding Office action, the claimed invention will not result. Therefore, the claimed invention is already patentably distinguished over Hata in view of Hatano.

Reconsideration and withdrawal of this rejection are respectfully requested.

Claims 3 and 13 are rejected under 35 USC §103(a) as being unpatentable over Hata in view Hatano as applied to claim 1 above, and in further view of Johnston, Jr. et al. (U.S. Patent No. 4,888,624).

Claim 13 is concurrently canceled herewith, thus rendering any rejection as applied thereto

moot.

In rejecting the claimed invention, the outstanding Office action also stated that a “further difference between Hata and the claimed invention is the first current blocking layer with a resistance value of not less than $1.5 \Omega\text{-cm}$.” The Applicant agrees with this Office assessed difference between the present invention and Hata. However, in view of the further difference in the first and second blocking layer between the present invention and Hata as explained in detail above, independent claim 1 is already patentably distinguished over Hata. All claims dependent thereon, by virtue of inherency, are also further patentably distinguished over Hata further in view of whatever secondary reference.

Reconsideration and withdrawal of this rejection are respectfully requested.

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CONCLUSION

In view of the aforementioned amendments and accompanying remarks, all pending claims are believed to be in condition for allowance, which action, at an early date, is requested.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 50-2866.

Respectfully submitted,

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Attachments: Petition for Extension of Time w/fee
Change of Correspondence Address

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